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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790,011	03/02/2004	Sang Chul Sul	2336-244	3566

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EXAMINER

SUMMONS, BARBARA

ART UNIT PAPER NUMBER

2817

DATE MAILED: 06/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/790,011

Applicant(s)

SUL ET AL.

Examiner

Barbara Summons

Art Unit

2817

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5 and 7 is/are rejected.
- 7) ☒ Claim(s) 4, 6 and 8 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3/2/04</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1 and 5 are rejected under 35 U.S.C. § 102(b) as being anticipated by Barber et al. U.S. 6,323,744.

Fig. 4B of Barber et al. discloses a ladder-type bulk acoustic wave (BAW) filter comprising: an input terminal being on the carrier printed circuit board (not shown) that is inherent in order to connect the ladder filter "to other components" via wire 281 (see col. 2, lines 58-60 and 63-67) and receive an electrical signal including a certain frequency; an output terminal to which wire 282 is connected to output an electrical signal within the predetermined pass band of the filter; a ground terminal to which the wire 295A is connected; a plurality of series resonators 207, 209, 217 and 219 (Fig. 4A) connected in series between the input and output terminals; a plurality of shunt resonators 210 and 220 (Fig. 4A) having one end connected to a contact point of the series resonators and second ends commonly connected to each other by a common

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terminal 230/270 (Figs. 4A/4B); and a common ground inductor being bonding wire 295A that inherently acts as an inductor (see col. 3, lines 1-6) for connecting the common terminal 230/270 of the shunt resonators to the ground terminal on the carrier printed circuit board (see e.g. 498 in Fig. 6).

3. Claims 1, 2 and 7 are rejected under 35 U.S.C. §§ 102(a) and 102(e) as being anticipated by Kimachi et al. Patent Application Publication U.S. 2003/0186673.

Fig. 13 of Kimachi et al. discloses a ladder-type BAW filter comprising: an input terminal (left of resonator 201) for receiving a signal; an output terminal (right of resonator 206) for outputting a signal in the predetermined pass band of the filter; a ground terminal (below inductor 220); a plurality of series resonators; a plurality of shunt resonators having their second ends commonly connected to each other via a common terminal being the unlabeled line above the inductor which is 16 in Fig. 11 (see section [0067]); and a common ground inductor 220 for connecting the common terminal 16 of the shunt resonators to the ground terminal (ibid.).

Regarding claim 2, see sections [0069]-[0072]. Fig. 15 shows another filter with slightly larger inductance values. Regarding claim 7, note that the claim uses the open-ended terminology "comprising" (see claim 1, line 2) such that there may be any number of additional elements besides those recited, and as such the filter is implemented so that four series resonators 203, 204, 205 and 206 are connected in series between the input and output terminals; and three shunt resonators 213, 214 and 215 are each connected to a contact point of any two of the four series resonators.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claim 3 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Kimachi et al. U.S. 2003/0186673 in view of Seabury et al. "Thin Film ZnO Based Bulk Acoustic Mode Filters".

Kimachi et al. discloses the invention as discussed above, except for the common ground inductor being implemented by a meander or spiral conductive pattern on the bulk acoustic wave filter chip.

Seabury et al. discloses (Fig. 8) that it is known to provide inductors connected to the shunt resonators of a BAW filter as spiral conductive patterns on the BAW chip.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the BAW filter of Kimachi et al. (Fig. 13)

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such that the inductor would have been a spiral conductive pattern on the BAW chip as taught, for example, by Seabury et al. (Fig. 8), because such an obvious modification would have been merely the substitution of art recognized equivalent inductors and because Kimachi et al. itself suggests forming some of the inductor on the chip so that flip-chip bonding of smaller inductance can be used (see e.g. section [0125]) rather than wire bonding.

Allowable Subject Matter

6. Claims 4, 6 and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record does not disclose or fairly suggest a BAW ladder filter with a common ground inductor that is implemented as a lumped element (claim 6) or a conductive pattern on a printed circuit board or a package (claim 4) on which the BAW ladder filter is mounted. Rather such an inductor is discussed in the prior art as being either on the BAW ladder filter chip or as a connecting element such as a bond wire. Further the prior art does not show the arrangement of resonators recited in claim 8.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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Ketcham U.S. 5,231,327 discloses a BAW ladder filter (Fig. 23) that has a common ground MG1 and MG2 (see Figs. 25C and 24), such that when mounting with bonding wires that inherently provide an inductance, there is an inductor between a common terminal of the two shunt resonators X2 and X4 and a package or printed circuit board ground terminal (see e.g. col. 10, lines 66-68 wherein there are limited number of art recognized equivalent "bonding" methods)

Inoue U.S. 2005/0093648 discloses a BAW ladder filter (Fig. 4) with a common ground inductor 126 for two shunt resonators 124 and 125.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Barbara Summons whose telephone number is (571) 272-1771. The examiner can normally be reached on M-Th, M-Fr.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bob Pascal can be reached on (571) 271-1769. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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June 1, 2005



**BARBARA SUMMONS
PRIMARY EXAMINER**